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Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

Vol. 236. 93rd Year. LONDON, DECEMBER 24, 1941. Registered as a Newspaper No. 4101. Price 1/-

TELEPHONES { GASWORKS SOWERBY BRIDGE 81450 SHOWROOM SOWERBY BRIDGE 81060. TELEGRAMS GAS-WORKS SOWERBY BRIDGE.

Sowerby Bridge Urban District Council.

Gas Works, Sowerby Bridge.

W. B. HARRISON, A.M.I.GASE ENGINEER & MANAGER.

Ref. WBH/DS

October 8th 1941

Messrs. Thos. Glover & Co. Ltd.,
Edmonton,
London, N. 18.

Dear Sirs,

I was very interested to read your recent advertisement, referring to the 5 light meter which was fixed in 1867, and which was correct when tested in 1941.

You may be interested in the history of another of your meters, which has recently been brought into our stores.

This is a 2-light ordinary meter which was supplied by you in 1873, and fixed in a small cottage in a hillside village of the West Riding on the 1st January, 1874, where, to the best of our knowledge the meter has remained in its original position since it was fixed, sixty seven years ago.

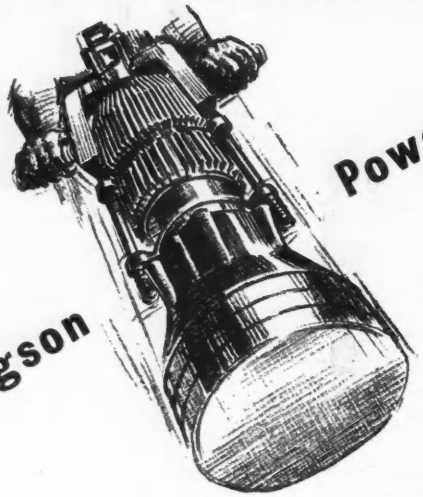
On being returned to our stores, it was tested for accuracy, and found to be registering correctly.

Yours Faithfully,

W. B. Harrison

Engineer & Manager.

THOMAS GLOVER & CO. LTD., EDMONTON, LONDON, N.18, AND BRANCHES



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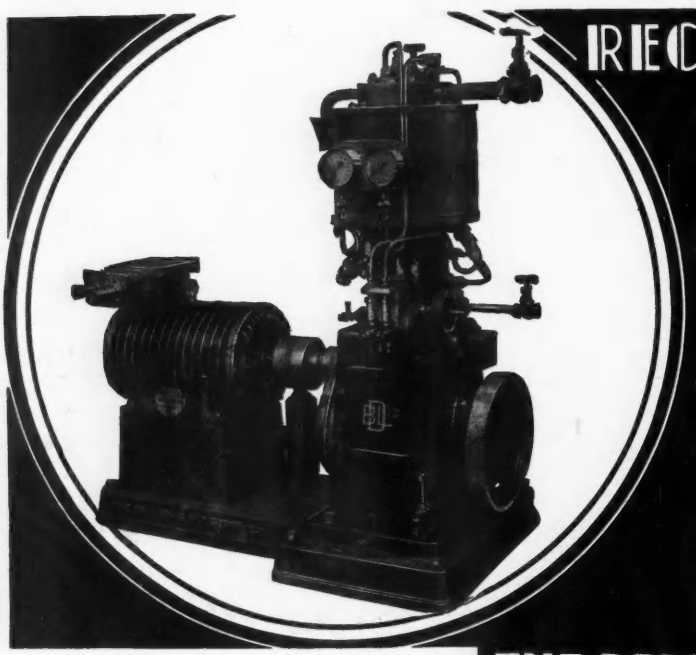
THE PEGSON Power Rammer is self-contained, is magneto operated and runs on Pool Petrol. Wherever earth is to be consolidated you will find Pegson Rammers in operation . . . and always hard at work.

The machine is self-lubricated and is absolutely foolproof and simple to operate.

PEGSON LTD., COALVILLE

'Phone: COALVILLE 234
'Grams: PEGSON, COALVILLE



RECIPROCATING COMPRESSORS for GAS or AIR

High Speed Vertical Reciprocating type

Easy Accessibility to Working Parts

Robust Construction and of the very latest design

Working parts of ample proportions Perfect Balance

The Compressor illustrated is a Single-Crank Machine fitted with splash lubrication, water cooled cylinders and intercooler and hand unloading device. Capacity —500 cubic feet per hour, against 150 lbs. pressure and running at 400 r.p.m.

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Engineers and Ironfounders.
Head Office and Works, CHESTERFIELD.
London Office: 3 Victoria St., Westminster S.W.1.

Members of the Society of British Gas Industries

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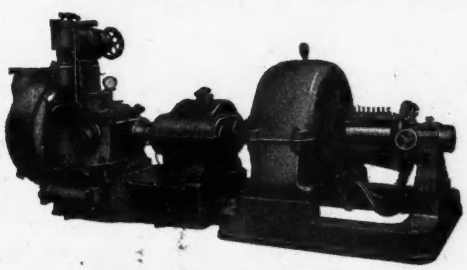
BROTHERHOOD
STEAM TURBINES FOR GASWORKS

Our Turbines, made for all powers up to 15,000 B.H.P. and for all conditions of service, are installed for driving Exhausters, Boosters, and Generators in many Gas Works, including:—

The Gas Light & Coke Co., South Suburban Gas Co., Wandsworth & District Gas Co., and in Works of Corporations and Companies at—Birmingham, Bristol, Coventry, Cardiff, Exeter, Liverpool, Manchester, Newcastle-on-Tyne, Preston, Portsmouth, Sheffield, Smethwick, Toronto, etc.



300 kW Back Pressure Geared Turbo-Generator.

Exhauster driven by 150 B.H.P. Steam Turbine at 13,000 r.p.m.

Brotherhood plant for Gas Works also includes Reciprocating Boosters, Water Cooling Towers, Air and Gas Compressors for all pressures and capacities.

PETER BROTHERHOOD LTD.

PETERBOROUGH :: Branch Offices in LONDON, LEEDS, MANCHESTER and GLASGOW

City and County of Newcastle upon Tyne.
WEIGHTS AND MEASURES DEPARTMENT.
Sale of Gas Acts, 1859—1901, Gas Regulation Act, 1920, and Regulations thereunder.
GAS METER TESTING OFFICE.
City Road,
Newcastle upon Tyne, No. 2.
NAME OF MAKER. DESCRIPTION OF METER. No. OF METER. Maker's 298145 Company's — Nature of Gas. Consuming capacity per hour. 30 cubic feet. READING OF INDEX at time of examination. 72,600
I hereby Certify that the above-described Meter was examined and tested on the 17th day of June 1941 in accordance with the provisions of the above Acts and Regulations, and was stamped
For accuracy of registration RESULTS OF TESTING. Correct
For internal soundness Correct
Other defects
Date of Mfr. 1867
Witness my hand.
TESTING FEE, £— 1s —
Wm. Taylor Inspector of Meters.
NOTICE.—Under the Gas Regulation Act, 1920, suppliers of Gas by means of an Unstamped Meter are liable to a penalty of not exceeding Ten Pounds. It is also provided by the Sale of Gas Act, 1859, that any person using or having an Unstamped Meter is liable to a penalty of Five Pounds.

SHOWN by the courtesy of the SHOTLEY BRIDGE & CONSETT DISTRICT GAS COMPANY.

This 5 LT. Meter was fixed in....

1867

IT HAS NEVER BEEN REPAIRED

IT IS REGISTERING CORRECTLY IN....

1941

THOMAS GLOVER & Co. LTD.

EDMONTON LONDON N. 18 AND BRANCHES

PARKINSON

INDUSTRIAL METERS

THE SOCIETY OF BRITISH GAS INDUSTRIES 1908

W. PARKINSON & Co. COTTAGE LANE, CITY ROAD, LONDON, E.C. 1

(Incorporated in Parkinson & Cowan Gas Meters, Ltd.)

Also at Birmingham and Belfast

P.8

GAS JOURNAL, DEC. 24, 1941

VOL. 236 93rd YEAR No. 4101

EDITORIAL NOTES

DOMESTIC WATER HEATING

OUR issues and our comments this month have been largely devoted to consideration of the development of the domestic gas water heating load for the future, the possibilities of the instantaneous heater having been set out by Mr. Friedman and those of the circulator type by Mr. Brooks. We have discussed certain of the points raised by both Authors, without any intention, however, as we said last week, of sitting in judgme t. What we have suggested is that all concerned with the development of this important domestic load, the requirements of which gas is so well fitted to satisfy, should cast aside preconceived notions and regard the subject anew in the light of a very great expansion indeed in the use of gas for this service. Last week our remarks were concerned chiefly with the provision of hot water for the bath, but this, of course, is one only of the domestic uses of hot water, a large volume of which is needed for washing, cleaning, cooking, and laundry operations; and provision of appliances for the community, as distinct from a particular section of it, must have in view this diversity of demand. The arguments advanced on both sides in the articles under review—to some of which we have already referred—will, we feel sure, be studied closely, and they should prove very useful to those who are planning for the future of the Gas Industry. We commented last week on "luxury" and "necessity," and we would repeat that "while agreeing in theory with experts' tables of heat requirements, we have found that it is not a difficult task to upset in practice theoretical test-bench figures or figures based on working results in particular households."

Before passing to a few remarks on future policy regarding domestic water heating, and, indeed, development of the domestic gas load as a whole, we would call attention to two of what may be termed "particular" statements made by Mr. Brooks. One was: "With a heated storage, rate of delivery is limited only by the size of pipe and head of water, and the tap temperature does not vary by rate of flow at any tap or should more than one tap be used at the same time." We think this requires a certain amplification, and a question we would ask—it is a point, we think, too seldom considered in discussions on water heating—is, What is implied by a 20 gallon or a 40 gallon hot-water storage of a specified temperature? Is a 20 or a 30 gallon tank of water raised to, say, 140° F., capable of delivering 20 or 40 gallons of water at a temperature of about 140° F. at the point of usage? We think that some existing storage systems are not designed to satisfy such a requirement. Reduction of stored water temperature below the thermostat setting by mixing with inlet water during periods of draw-off is equivalent to a reduction in the heater's storage capacity. Of course, if theoretically perfect separation or stratification were possible a storage water heater would be able to deliver its full capacity of hot water at the specified temperature. On the other hand, where there is considerable mixing of hot and cold water the storage vessel must be larger in proportion to the maximum hot water demand or the recovery capacity increased for a given amount of hot water. The other statement was in regard to the need for lagging to reduce the running costs of heaters of the circulator type. For quite a small unlagged tank—say, 25 gallon—containing water at 140°F. and having a surface area of about 18 sq.ft., the heat loss will represent a gas consumption (500 B.Th.U. gas) of about 5½ cu.ft. an hour. Lagging is of great importance in all storage systems, notwithstanding that the heat "losses" from an unlagged system can be usefully employed for airing linen and do in fact help to maintain a comfortable house temperature.

Now, for a moment, let us consider future policy, envisaging a vast increase in the demand for gas for hot-water supply. Mr. Brooks, remarking that any considerable addition to the water heating load must react on the size of the undertaking's mains and other equipment, which means the building-up of its capital, contended that any equipment that tended to spread the load should be given prior consideration when reviewing post-war tariffs for gas. The capacity of holders has the advantage of levelling-out the works output, but, he said, "mains are another matter." Questions of load factor, capacity of mains, adequacy of storage, capacity of gas-making plant, and so on, do enter into the widespread adoption of gas for domestic water heating, and the same applies to the development of other domestic loads. But we visualize as a first step towards a future greatly-expanded gas service an abundant supply of gas—and at any part of any area. To give an abundant supply when and where needed must involve a good deal of planning on new lines and the expenditure of a large amount of capital. We shall probably see a great linking-up of mains of adequate capacity—and this capacity takes on a different complexion when we think of the supply of gas through them, as seems likely, at higher pressures. The capacity can, in fact, be made surprisingly large. We shall doubtless see the closing-down of relatively inefficient small gas-making plants; we may see the erection of pressure holders at strategic points on the district. All this will cost money and it will demand broad and courageous planning. But the needed capital would surely be destined to be spread over a far greater volume of gas sold and should ultimately, if not immediately, result in a reduction in the price at which gas could be offered for "wholesale" use. The change cannot be effected overnight; but vast changes in gas distribution practice must be envisaged if we are to cope with vastly increased consumption. The changes may well modify our present ideas, based on current practice, of the relative values of different loads and of the incidence of particular appliances on the load factor. Now that the Gas Industry is vigorously engaged on the problem of planning for the future, the discussion we have published in our issues this month on one aspect—the future of the domestic water heating load—will, we hope, prove of value in crystallizing thought and ideas.

"JUNIORS"

FROM private correspondence and from conversations with friends in the Industry we know that considerable interest has been taken in the suggestion put forward in our issue of Nov. 26 that the time was ripe—in spite of war conditions—to come to some decision on the advisability of abolishing the term "Junior" in connexion with gas associations. It is not a new idea; the question was mooted as long ago as 1937. At that time it seemed to us that the arguments against the suggested change were flimsy and unconvincing. The idea that it would somehow or other spoil tradition was among them. The point is, however, that the easy path was taken and, unfortunately, as with so many other questions, the matter was conveniently shelved.

We appreciate that the war has brought many pressing problems demanding immediate attention and solution, and that it has depleted the Industry's personnel. But we would ask whether these war conditions are sufficient grounds to justify continued shelving of questions such as this. We do not know how long the war will last, but it would seem that its end is by no means near. It has been realized that planning for the immediate future and the post-war era is needed. As is well known, the Gas Industry has established its own organization for the purpose. We suggest that among the items of reconstruction which call for present consideration is this question of the structure and status of the junior associations and their relationship to the parent professional and technical body The

Institution of Gas Engineers. On many occasions and on many platforms prior to the war the fundamental fact was emphasized that if the Gas Industry wanted to keep pace with progress it must attract to it young men of capability who would be proud to joins its ranks. The need for this encouragement has not been lessened by the war, and there is no doubt about it that when the war is ended the need for trained and keen minds will be there. We think that retention of the term "Junior" and the existing structure of the junior associations is not calculated to help in the attraction deemed essential. "Junior" is an archaic and unnecessary description, and it is faulty.

It is not that there is lack of constructive ideas concerning the matter. Change of title was advocated by Mr. Le Fevre in 1937 when he was Chairman of the Junior Joint Council; and he pointed out in a letter which we published in our issue of Dec. 10 last that the suggestion received considerable support from both "seniors" and "juniors" in many parts of the country—after which the shelving process was conveniently adopted and, on the surface at any rate, contentment reigned. And in his letter Mr. Le Fevre clearly set out concrete proposals for reconstruction. We wish to give prominence to his main proposal in the hope that it will be considered anew and with a view to action. In brief, having questioned the *raison d'etre* in circumstances of to-day of such a welter of technical associations with many and sundry titles in the Gas Industry, and having characterized the present organization as "clumsy," he asked the query: Why not one Institution—that is, one Institution with its appropriate branches? We ourselves cannot find good reason to explain why the Gas Industry on the professional and technical side should be differently organized from its sister institutions—Civil, Mechanical, Electrical. District Branches of The Institution of Gas Engineers could take the place of existing "senior" bodies, and *bona fide* students could become Students of the Institution and, as such, could attend the meetings of their District Branch of the Institution. To our mind a unified professional and technical gas organization on these lines would foster co-operation between the experienced engineer and the student and would definitely help in attracting to the Gas Industry the type of young man of which it will most certainly stand in need in the future.

THE AIMS AND FUNCTIONS OF PUBLICITY

The fifth of a series of articles on various aspects of publicity specially contributed to the "Gas Journal" by the British Commercial Gas Association. Previous articles appeared in the "Journal" of Sept. 24, Oct. 15, Nov. 12, and Nov. 26.

THE AUDIENCE FOR GAS PUBLICITY

IN the days before coupons a store proprietor had only to announce the date of a sale and he would be quite sure that before the doors opened on the first day he would have to elbow his way in through crowds of women before he could open the shop. Short of translating it into a foreign language, it would be almost impossible to produce an unsuccessful "sale" advertisement. So long as the date and the place are made clear, thousands of people will turn up early.

The Appeal of "Sales" Advertisements

In fact, no "sale" advertisements are as simple as that, partly because of the conscientiousness of advertising departments who like to show that they are on the job, by cramming as much as they can into the space, and are harried by the departments to do so, partly because even at sales time the shops compete with each other for the customers available. Consequently, in addition to the announcement of place and date, "sale" advertisements have lines of large type with variations on the themes of "Amazing Reductions," "Stock must be Cleared," and so on. In addition there are pictures of many types of the goods to be sold which almost invariably are accompanied by some such device as "Reduced to 15/3." No one could say that this device has any freshness, for it has been a standby for over 100 years, but it comes up year after year and is still working, a standing reproach to advertisers who fall over backwards in trying for originality.

The reason for dealing with "sales" advertising here is that it shows advertising in its simplest form, as a selling idea addressed to the audience which is intended to act on it. A "sales" advertisement presents the inducement of getting goods below their normal price or *even below cost* to women. Invariably thousands of women respond and few men. Advertising would be a fairly easy business if the audiences to be addressed could be classified so simple, and if all messages had so powerful an appeal.

The Basis of Gas Advertising

Consider who are the people to be reached by gas advertising. From some points of view, and for some specific advertisements, they can be split up into classes. On the other hand, if the straight question is put, "To whom is gas advertising addressed?" the only true general answer is, "To everybody." The sale of gas has almost none of the elements of a simple sale like that of a pound of meat. There the buyer pays her money, takes the meat away, and if she finds it good goes back to the same butcher for more. If not (let us forget registering in order to get on more easily), she changes her butcher. The use of gas is not, however, a day-to-day business. A customer once equipped with the apparatus to use gas is committed to use it probably for years. This applies with boomerang force also—a customer who installs some other method of cooking, heating, or lighting has practically disappeared from the pool of possible gas users for a considerable time.

The appeals to sell gas, therefore, must take two main lines—the long-term line that gas is the best fuel or lighting agent to persuade people to adopt gas equipment such as cookers, fires, water heaters, furnaces, or street lighting, and the short-term line of urging those people who have gas equipment to make more use of it. To these must be added the wartime necessity of persuading the general public to use less gas, in the national interest.

The Gas Industry's Audience

Some gas advertisements must be addressed directly to engineers and factory managers on the industrial uses of gas. Others to town councils or other municipal bodies. Plainly, it will not be much good to make use of extreme salesman's language and end up with some such war-cry as "Don't waste another minute—take to Gas now." Any action that may be taken is almost sure to be after careful deliberation and weighing of results. Advertisements to industry should be fairly plain, if enthusiastic, statements of facts. Actual examples of successful gas installations are probably the surest way of interesting a possible client to the point of making further enquiries.

The audience for advertisements for the domestic uses of gas is by far the most part women—there is no need to argue or enlarge on that. It would be a mistake, however, to miss the importance of men. Who wants a comfortable fire when he comes home on a cold evening and who wants quick hot water for shaving? Who in the end has to produce the money without which no transaction will ever take place? A man is not likely to take much part in discussing whether his wife is to use a gas cooker or some other. But he is very likely to be consulted over the purchase of a water heater. Domestic gas advertising must be framed in a way that will move women, but if it forgets men it will not go as far as it should.

Finally, there is the consideration that the Gas Industry must be kept in the public mind as something not only efficient but modern and fashionable. In some ways the length of its history is a disadvantage when compared with more recent innovations. Gas advertising must represent the spirit of something alive, something that is supposed to be implied in the word "streamlined." Gas needs the approval of the whole nation and a frame of mind which takes years to build up. The ideal target for advertising to this end would probably be children, although it could hardly be reached by straight press advertising. But it should always be remembered that every gas advertisement, as well as direct selling, is helping to bring about a mental attitude which may not be perceptible at once, but which will have a powerful effect in the end.

MAKING AN ADVERTISEMENT

IT is possible to produce advertisements without using any words at all. Where people cannot read it is necessary to do so, and advertisements in Eastern newspapers, for instance, often consist of nothing but a picture of a package. The customers to whom it is already familiar can usually identify it by a large illustration of some familiar object—perhaps an axe, or a bird. This is the "shop" or trade-mark, and the first use of words between the advertisement and the sale occurs when the buyer asks for the product by the name of the object in the trade-mark. Robin Starch in the East is called "Bird Starch," and so on.

This is an exceptional and limited type of advertising and for the most part, although pictures are of the very greatest assistance in dramatizing a situation or explaining a process, it is impossible to make a complete advertisement without words, even if they are only the brand name, whereas it is always possible to make one of a sort without illustration. Some of the Russian leaflets and posters suggesting methods of sabotage and other underground warfare come near to doing without words, but, while they can show a hand clipping a telephone wire, they have to write the reasons why this should be done. If a balance has to be struck between the importance of words and illustration in advertising, it must ultimately come down in favour of words.

The words in advertisements are called "copy." So are all the words that are submitted to the editors of newspapers. Dictionary definition of copy is "manuscript for printing," but the origin of the term is uncertain, and is occasionally the subject of scholarly correspondence in *The Times* and elsewhere. Those who write the words are "copy-

writers." The remaining parts of the advertisement—illustration, kinds of printing type used for headlines, slogans and other matter—and their arrangement in the space are called the "layout." Those who construct layouts are called "layout men." These terms will be known already to many readers, but it is necessary to mention them. "Copy" and "layout" are the only visible ingredients of a printed advertisement, and it is difficult to discuss advertising without using them.

Do People Read Advertisements?

Nearly everyone has been taught to read and write, while few have even a rudimentary knowledge of drawing, typography or display. Consequently, most of the arguments about advertisements are about the copy. Critics embark on statements large enough to halt a philosopher, usually beginning with the word "people." "People won't read long copy" is one of these, brought out with the confidence of one announcing, "A straight line is the shortest distance between two points." "People don't want to read advertisements" is another. The facts of these matters do not admit such wholesale pronouncements. Some people read all advertisements from beginning to end. Certain types of people give special interest to certain types of advertisement—for instance, any advertisement headed "Rheumatism" or "Acid Stomach" is certain of a large readership. Any advertisement headed "Free" in bold letters is sure not only of readers, but of a substantial mail from those who write in for the free offer.

People can have temporary interests and look out for special advertisements while these interests last; when they need jobs, houses, motor-cars, they go through the announcements carefully—at other times they may ignore them.

On the question of long or short copy, people who are interested will go through copy of any length, even if they have to do so by the light of torches in the blackout.

There is one fundamental, and that is to address people in a language that they understand. There is a great difference between fine writing and good writing, but the difference between fine writing and good copy is vast and expensive. Ninety per cent. of the adult population of Great Britain left school before they were fourteen. It is no use holding forth to them in delicately-balanced sentences of abstract nouns. Long or short, the aim of copy is to make points clearly, forcibly, persuasively. It is true that some people are impressed by windy and bewildering prose like Ramsay MacDonald's, but it does not lead to action.

This does not mean that anyone who knows his letters can become a good copywriter by putting down his thoughts in his own rude fashion. Copy should be clear but not bald, simple but not stark. To write clearly is not easy, still less to write persuasively at the same time. A blind man in America was making a modest living by exhibiting an advertisement written by himself, "Totally blind—please help." No doubt that this is clear and gives the facts. However, when a copywriter altered this sign to, "It is Spring—and I am blind," coins came rattling into the tin at an astonishing pace. Words in themselves can determine whether an idea limps or flies.

Austin Reed's advertisements before the war were addressed to rather smart young men—they were slick and full of wisecracks—but what is more they were full of information and always put in the price of the goods mentioned. Rose's Lime Juice advertisements were written for the hangover classes, who could appreciate the use of the style and characters of P. G. Wodehouse. These advertisements, like Austin Reed's, were informative on their own subject and never failed to make their point. Both were delightfully written and dead right for their own audience, but they would be mystifying ways of writing to working women about (say) Gas.

In judging copy never lose sight of the audience. A man who has never done a hard day's washing, got four children off to school, made beds and prepared meals for a husband, has to make a deliberate effort before he can come near appreciating the type of writing that is needed for housewives.

So on, through the many, various divisions of income, age and sex. Each has its own outlook and its own language. To each at different times according to the product and the idea, copy should be bright, impressive, manly, womanly, chatty, alarming. At all times it must be convincing, easy to remember, and very easy indeed to understand.

Personal

A. E. Sylvester

Mr. A. E. Sylvester, whose appointment as General Manager of the Gas Light & Coke Co. has already been announced in the "JOURNAL" has been elected Chairman of the London Regional Gas Centre, in place of Mr. R. W. Foot, and he has also been appointed to succeed Mr. Foot as representative of the London District Executive Board on the Central Executive Board of the N.G.C., and representative of the Board on the National Gas and Electricity Committee and on the Council of the Conjoint Conference of Public Utility Associations.

* * *

Among those to whom General Auchinleck made immediate awards for gallantry in the Libya Campaign appears the name of Major G. G. L. WILLIS, who is awarded the D.S.O. Major Willis holds the position of local Manager of the Woking Gas Company, which is controlled by the Wandsworth & District Gas Company.

Obituary

T. H. Poulson

The death has taken place of Mr. T. H. POULSON, Engineer, Manager, and Secretary of the Stafford Gas Department. Mr. Poulson received his mechanical training in the workshops of Messrs. W. G. Bagnall, Ltd., and his training as a gas engineer at the Stafford Corporation Gas Department, under Mr. Hubert Pooley. Mr. Poulson was appointed Assistant Manager to the Cannock, Hednesford, and District Gas Company, and later Technical Assistant to the Nelson Gas Department. In 1914—on the death of his father, who had been Works Superintendent for 29 years—Mr. Poulson returned to Stafford to succeed him in that position, and was appointed Engineer and Manager of the Undertaking in 1921. Mr. Poulson was an Associate Member of the Institution of Mechanical Engineers, and a Fellow of the Chemical Society. He had been a Member of The Institution of Gas Engineers from 1919, was a Member of the Institution Council from 1933–35, and was President of the Midland Association in 1933.

* * *

We regret to announce the sad loss which Mr. A. R. BARFORD, for many years Sales Manager of Lighting Trades, Ltd., and the Welsbach Light Company, Ltd., has suffered through the death of his only son, Pilot-Officer Alan H. Barford, who has been killed on active service. Pilot-Officer Barford was serving with the R.A.F. Bomber Command.

Letter to the Editor

Wartime Production of Benzole at Gas-Works

SIR,—I was very much intrigued by the article on "Benzole Recovery at a Very Small Gas-Works" in your issue of Dec. 10. Here is a very praiseworthy example of foresight on the part of the Engineer, and apparently a good case of "reward of merit" in that even on so small a works the enterprise has proved very profitable.

I can't help feeling, however, that there is an underlying indication in this, as well as in the appeals in your recent Editorials, that there are still gas undertakings in this country influenced by mercenary or other unworthy motives against the installation of plants for the production of benzole and toluole.

It must be obvious to anybody that these products are most urgently required in maximum quantity for the successful prosecution of the war. Should any other consideration be allowed to weigh against this?

Are there really still gas engineers in this country who are at present weighing the profitable aspect of benzole production? If so, I should like to suggest that these backward undertakings be listed in the "JOURNAL" from week to week so that "Iron Crosses" may be reserved for them, and the Luftwaffe would no doubt be instructed to treat them with due consideration.

Yours, &c.,

Dec. 12, 1941. "BEN SEAN."

Man Cooling Fans

A new eight-page catalogue (V 201) from Keith Blackman, Ltd., Mill Mead Road, Tottenham, N. 17, describes their portable electric fan units for blowing cool air at workers engaged in hot spaces, such as at retort benches in gas-works, furnace fronts in iron and steel works, &c. The fans range from 15 to 42 in. in diameter, and the larger fans are provided with a universal swivelling head to give complete directional control of the air flow in both planes, and they can, if required, be fitted with universal castors under the base, with facilities for easy swinging. Where floor space is limited the fan units can be adapted for suspension from roof girders. The fans are effective up to 50–60 ft., according to size.

The Council of the British Gas Federation has decided that, in view of the present exceptional circumstances, the Seventh Annual General Meeting of the Federation shall be deferred until a more opportune time to be determined later.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

FLEXIBILITY OF CARBONIZING PLANT UNDER WARTIME CONDITIONS*

By T. CAMPBELL FINLAYSON, M.Sc., M.Inst.Gas E.

FROM the point of view of the gas engineer, the ideal daily gas production chart would show a straight line, with the same hourly make for each of the 24 hours. The ideal gas consumption chart would also show a straight line for hourly send-out, but in fact the gas consumption chart is a matter of peaks and valleys which bears little relation to the ideal straight line. From this difference in the shape of the production and consumption curves, two points emerge. First, some means must be provided to meet the peaks and valleys of gas consumption, and second, the summation of the hourly production and of the hourly consumption must coincide each 24 hours or so.

The balance between production and consumption is attained by two means—first, gasholder capacity, and, secondly, flexibility of output of the carbonizing plant or other gas-making unit. Under war conditions, even greater interest has been focused upon the flexibility of carbonizing plant.

It will be generally agreed that constant conditions of operation of a modern high temperature carbonizing plant lead to highest efficiency of performance and lowest maintenance cost. This has been stressed by plant designers and plant operators. But emphasis on this feature may have tended to give the impression that modern high temperature plants are somewhat inflexible as regards variation in output, and that substantial changes in output would be accompanied by serious difficulties and even damage to the plant.

In view of the special circumstances, it is hoped that a few notes on the flexibility of output of two forms of modern carbonizing plant—continuous vertical retorts and intermittent vertical chambers—may be of interest.

It is necessary to distinguish between demands for gas which may be reasonably anticipated and demands which are unexpected. Different methods may be necessary to meet these two cases.

Continuous Vertical Retorts

Dealing first with continuous vertical retorts, the methods of varying output may be discussed under four headings:

(1) *Variation in Coal Throughput.*—Continuous vertical retorts lend themselves to variation in coal throughput over certain limits by the simple expedient of altering the rate of coke extraction. The extent to which this variation in throughput can be applied depends on a number of factors such as type and grading of coal, the calorific value of the gas being made, and the design of retort. If constant calorific value of the gas is to be maintained, reduction in coal throughput demands other changes such as reduction in retort steam and in combustion chamber temperatures. It is found generally that the throughput of a retort can be reduced 25–30% within 12 hours while maintaining satisfactory retorting conditions. To resume full throughput may take up to 24 hours. It is also to be noted that, at a sacrifice in yield of gas per ton of coal, continuous vertical retorts may be worked at an overload of 5–10% above rated gas output.

(2) *Scurfing.*—The normal reduction of output due to a regular cycle of scurfing is about 7%, and by varying the scurfing programme to suit output requirements a substantial degree of flexibility can be attained. Thus, if an undertaking has a low week-end demand, all scurfing can be carried out at this time, resulting in a 20–25% fall during the week-end and full output during the week. A fact to be remembered is that reduction in output due to concentrated scurfing must persist for approximately 48 hours, followed by a period of 24 hours during which the output of the retorts put to work after scurfing is only 50% normal. Also, a concentrated scurfing programme does not give the same opportunity for hot patching or welding of retorts. The fact remains, however, that it is a means of varying output which has successfully been adopted on many works.

(3) "*Standing*" *Retorts.*—To meet sudden unexpected reduction in gas demand, the practice of "standing" full retorts has been adopted successfully on many works. The method has the advantage that with the minimum of delay and of labour cost the gas output can be "picked up" to normal. When it is desired to "stand" any given retort the procedure adopted is, briefly, to stop the coke extractor, shut off the retort steam, fill the auxiliary coal hopper with coal, check the retort temperatures to scurfing heats, and keep the retort offtake pressure at "level gauge." About five hours after standing (varying according to the calorific value of the gas being made) the retort gas offtake valve is closed from the collecting main and the gas allowed to blow off to waste. When it is desired to restart the retort, the extractor is started, the heating control dampers are opened up to working positions, and coal charging resumed. It is found that the retort will be making gas usually within an hour of restarting, and in eight to twelve hours the make is back to normal. It is found that all but those retorts which are nearly due for scurfing restart satisfactorily.

Any holding up in the retort after standing is usually due to the "blistering" of the scurf, following its rise in temperature and consequent expansion when the retort is standing. Retorts which are heated upwardly are found to lend themselves more successfully to "standing" than do those which are heated downwardly. It is also found that the success or otherwise of the "standing" method is dependent more upon the nature of the scurf than upon the swelling properties of the coal.

This procedure is adopted at some works at such times as Bank Holidays or for effecting emergency repairs at the works, when the whole of a battery of retorts may be stood. It is usual in the few days before such an extensive shut-down to cease scurfing so that on the restart the retorts which require scurfing select themselves by not working well. An instance can be quoted where 66 retorts were stood for a day and of these 62 went to work satisfactorily, normal gas output being resumed in 24 hours.

The method described above implies that the production of a continuous vertical retort installation can be reduced by 50% in five hours or so, and can be brought back to full output in a comparatively few hours with little trouble or labour cost. By selecting retorts which are not more than half-way through their scurfing cycle there is little likelihood of blistering of scurf and, therefore, a high degree of probability that all the retorts will go to work without trouble.

No retort should be allowed to "stand" for more than 48 hours to avoid any tendency for damage to the retort walls consequent upon ash liberation from the surface of the coke,

(4) *Coal Quality.*—The output of gas at a given calorific value from a continuous vertical retort varies considerably according to the nature and grading of coal which is being carbonized. At these times, especially when gas engineers are endeavouring to meet high demands for gas with coals not of their own selection, it may be worth placing on record that, for example, the output of therms per day from a given retort is reduced by 20% by changing over from Yorks. Nuts to Durham Run-of-Mine Coal.

In certain circumstances it may pay undertakings to carbonize the coals which give lower output per retort per day during a portion of the year when demand is lower, and to store the coals which give higher outputs per retort per day for use in times of high demand.

The four methods described above give the means for a substantial variation in gas output from a continuous vertical retort, but the story would not be complete without mention of a further method which is applicable also to intermittent vertical chambers—namely, partial coal-gas firing.

Partial Coal-Gas Firing

It has been found in practice that up to 50% of the heating value of the fuel gas required for any setting can be supplied in the form of coal gas. This is effected by introducing the gas through the front wall of the producer above the producer cleaning doors. The coal gas makes its way through the red hot fuel bed, is cracked, and mixes with the hot producer gas. It is found that no difficulties result in utilizing a proportion of coal gas in this way. The method has the advantage that it is an instantaneous means of either reducing or increasing the make of gas from the retort house. If a plant is making 1 million cu.ft. of gas per day and it is decided to turn over to partial coal-gas firing, the reduction in output is immediately about 22%.

Alternatively, if a plant already on partial coal gas firing is making 1 million cu.ft. of gas and it is decided to stop partial coal-gas firing, the increase in output is immediately about 28%.

It should be emphasized that partial coal-gas firing up to 50% of the total fuel requirements of the setting introduces no operating difficulties. It involves the provision of a header main along the producer front and distribution means into the different producers. In order to save purifier costs, unpurified gas is employed. The present occasion is not one in which the economics can be discussed at length, but calculations show that taking coal at 30s. per ton and coke at 30s. per ton, the extra cost of partial coal-gas firing does not increase the retort house cost of gas by more than ½d. per therm of gas made. Of course, partial coal-gas firing involves the use of more coal than is necessary per therm of gas sold, but in special instances, as, for example, a means of meeting the demand of some large user who requires gas for only a portion of each 24 hours, the method is simple and economical, especially if holder capacity is limited.

Intermittent Vertical Chambers

Considering the case of intermittent vertical chambers, it can be said that the output of a plant can be reduced by 50% in six hours, and that the output can be picked up to full in twelve hours. The above reduction in output of 50% would be attained by discharging chambers as they became due, and leaving them empty until only one-half the plant remains at work. As additional chambers are discharged throughout the bench, the working chambers would be concentrated into half of the settings, the other half of the settings standing empty. The combustion chamber temperatures on the settings standing empty would have to be reduced. When full output is again required, it is necessary to raise the temperatures of the standing settings before charging, but full normal output can be obtained in twelve hours.

* Paper to the Eastern Counties Gas Managers' Association, Nov. 20.

Output on intermittent vertical chambers can also be reduced by lengthening the carbonizing cycle. Thus a 50% drop in output follows the increase in carbonizing time from 12–18 hours. But this step involves reduction in temperatures and in steaming if calorific value is to be maintained. This slowing down of cycle is best done in easy stages and is only of use for meeting anticipated changes in demand. The converse also applies, as it is very undesirable to speed up production by shortening the carbonizing cycle too rapidly.

To sum up, there is no difficulty with a modern continuous vertical retort plant in meeting sudden changes in gas demand provided that suitable steps are taken. If there is a sudden need to reduce gas make, then in one hour the output from a given plant can be reduced by 22% (by adopting partial coal-gas firing); in six hours the output can be reduced by a total of 72% (by standing 50% of the retorts and by partially coal-gas firing), which is as far as reduction is likely to be required. Within six hours the output can be back to normal. The above degree of flexibility is attained without taking advantage of the more usual methods of slowing down the retorts or concentrated scurfing. Intermittent vertical chambers have been shown to have the same flexibility.

ASPECTS OF THE OFFICE ORGANIZATION OF A LARGE GAS UNDERTAKING*

By A. F. POLLOCK, M.A., B.Com., C.A., Edinburgh

SOME technicians regard the clerical establishment as an oncost of somewhat dubious value. The fact remains, however, that clerical labour appears to be absorbing gradually a larger and larger proportion of the employed population. The census for Scotland of 1901 showed this proportion to be 9%, and this had increased to 12% in 1911, 16% in 1921, and 18% in 1931. The reasons for this are perhaps to be found first in the tendency which has been evident for some years past for commerce and industry to operate in larger groups and, as in the case of our own Industry, on a national scale; secondly in the extension of Government control of industry; and thirdly in the greater number and complexity of the laws relating to taxation and social services. All these developments seem to create the need for more statistical returns and records of one kind and another.

Whether we like it or not, therefore, clerical labour is becoming, to a growing degree, a factor in cost of production. If we regard the clerical establishment in this light as an item of cost, then perhaps we can all agree that our ultimate objectives, be they technical or clerical, are very much the same, in that we are all concerned to reduce cost of production by the adoption and development of the most efficient and scientific methods.

The essential functions of the office of any gas undertaking, whether large or small, are the same, and may be broadly defined as, on the one hand, providing the means of conveying the wishes of the consumers to the production departments for action, and on the other, of keeping records for the information and guidance of the management.

In the very small undertakings, these functions are performed by persons who know every aspect of the office work, and who very often carry out duties connected with manufacture or distribution as well. This was well exemplified in the case of a small undertaking recently absorbed by the Edinburgh Undertaking, where one of the staff taken over had a working knowledge of carbonization, gasfitting, main laying, office work, and meter reading, and a remarkable personal knowledge of the individual consumers as well. This comprehensive knowledge of the undertaking, especially when it extends to the undertaking's customers, makes for smooth working and good public relations, and helps to avoid the silly blunders and misunderstandings which can occur in the absence of such knowledge.

The advantages which the small undertaking enjoys in this respect are lost to the larger undertaking, in which the personnel tend more and more as the business increases in size to become specialists, and in which many even of the office staff know only a small part of what goes on in the office itself. The problem to be solved, therefore, by the large business is to substitute for personal knowledge an office organization which will provide an equal standard of service to the public and to the management. To do this, certain fundamental principles must be observed, and these are that every transaction must be dealt with in each aspect by that section of the business which specializes in that aspect, and that these specialist sections should perform their functions as nearly simultaneously as possible, so as to have the transaction completed in the shortest possible time. This is particularly important where the transaction relates to consumer service.

The problems involved may be illustrated by a type of transaction which is an everyday one in all gas undertakings, large or small. A lady calls at the showroom of a small gas company and asks for a certain type of cooker to be supplied to her on hire-purchase terms. The attendant knows the customer and is sure of her financial integrity. He perhaps knows the house or others like it, and knows that the type of cooker chosen is suitable, and how much pipe will be required to fit it. He knows that the fitter has no jobs on hand next morning, so he gets the necessary agreement signed and promises to do the job next day.

The same thing happens in the showroom of a large city undertaking. The attendant there has no knowledge of the customer, that is the province of the records department in the office; he may not know if the article is in stock, that is the province of the stores department; he does not know whether the appliance chosen is suitable for the position allotted to it in the house, or whether any piping will be required to fix it, the inspection department is responsible for finding that out; he has only a vague knowledge of the amount of work already in hand in the gasfitting department, or of when the job will be done, the office has to give guidance on this point. All the attendant does know is the approximate normal time taken for such work, and with this the customer has to be satisfied except in cases of urgency, when the attendant would get in touch with the office and make special arrangements and a definite promise for the work to be done at a specific date and time.

In the ordinary course when the order comes from the showroom to the office, the office must set in motion all the departments mentioned—records, gasfitting, stores, transport, and so on—and must do so quickly, because the customer, once having decided to buy, generally expects prompt delivery.

It requires careful organization, therefore, to handle smoothly the number of orders and enquiries which deluge a large office day in and day out. In the days before the war, the office of the Edinburgh Gas Undertaking handled about five hundred every working day, or more than one every minute, and it is in dealing with large numbers of documents that mechanical and other aids, some quite simple, can be usefully employed.

One obvious but useful aid to efficiency is the use of multiple copies of documents. The filling-up of forms in duplicate and triplicate is not uncommonly, and sometimes perhaps quite rightly, regarded as evidence of inefficiency and red tape, but so long as the practice does not get out of control, it can contribute considerably to the smooth working of the whole organization.

To take a very simple example from the Edinburgh Undertaking; every order from a consumer, no matter what the nature of the order may be, is written on what is known as an Enquiry Form, which is given a serial number by means of an automatic numbering stamp immediately on receipt. This document must be indexed promptly because an index is of little value unless it is completely up to date, and the order must almost equally promptly get into the hands of the department, usually the distribution or sales department, which has to deal with it. The enquiry form is therefore always made out in duplicate, the duplicate being used for indexing and filing as a temporary office record of the order, while the original is free to pass on for attention elsewhere.

A more complicated example of the use of multiple copies, this time requiring some special mechanical aid for their preparation, is to be found in the Job Sheet. When the Sales Department has successfully secured an order as the result of the original enquiry form, the enquiry then becomes a job, involving the issue of appliances, meters, and material from the stores, the transport of the goods to the site, and the work of fitting. The job sheet prepared in the office is the document which sets the wheels in motion and in normal times there are perhaps seventy to a hundred of them created every day.

There are six copies of the job sheets each serving its own purpose, as follows:

(1) This is the order to the fitter, and on it he makes his report. It is so designed as to give the fitter the minimum of clerical work and to serve as a reminder to him of all the points which must be embodied in his report. It is, of course, released to the fitter only when delivery has been effected.

(2) Serves as a delivery order to the transport foreman, who is thereby enabled to plan the routing of his transport while the goods for delivery are still being got ready and labelled in the store.

(3) Is the temporary office record and is used primarily to record the progress of the job.

(4) Is the authority for the store to issue the appliances and material and provides them with all the information required for the purpose. This again saves much clerical work in the store, because all the storekeeper has to do it to tick off items issued instead of writing them out in full. As soon as the material is issued, this copy is returned to the accounts department for posting to the stores ledger. This function of the copy is important, because sometimes for one reason or another a job may take some time to complete, and if the accounts department had to wait for the return of copy No. 1, the records of stores in hand would be out of date.

(5) Goes to the meter stores and serves the same purpose there as No. 4 does in the general store.

(6) Is of less importance. The storekeeper likes to keep a record for reference, for a limited period, of the appliances issued, and this copy serves this purpose.

There is also a seventh copy restricted to a narrow slip showing the name and address and job number which is pasted into an index book, again to save the labour of writing the index.

* From a paper to the Scottish Junior Gas Association (Eastern District).

It will be seen that the multiplication of copies in the case of this document achieves two useful results by first reducing clerical work, particularly in those departments where clerical work is most shunned, and secondly by setting all departments to work on the job with the minimum of delay.

So far I have dealt with some aspects of the office organization which are concerned with facilitating consumer service. There is the other side of the picture, which relates to the collection of revenue. This naturally appeals less to the consumer than good service, but for the gas undertaking the rendering of accounts is a matter of considerable importance and urgency. The accounts to be rendered include those for apparatus and fittings, for residuals, and for gas. As is to be expected in an undertaking of considerable size, the total number of accounts to be issued runs into many hundreds every day. When accounts are numerous and there is also a high degree of uniformity in the nature of the charges it is generally advantageous to adopt a system of what has been called mechanized accounting. In the case of accounts for apparatus and fitting charges there is so much diversity in the details of the charges that the requisite uniformity is lacking, so that the scope for mechanical aids is limited. On the other hand, a high degree of uniformity exists in the accounts for residuals and gas, and in Edinburgh the issue of these accounts is a highly mechanized process.

In regard to methods of rendering accounts for residuals, only a few years ago, customers received advice postcards by post in the case of rail despatches, and weight tickets in the case of despatches by road. Each despatch was recorded on a despatch sheet, and from these despatch sheets the entries were posted to the customers' ledger accounts by hand. At the end of the month the ledger accounts were totalled, and extracted on a separate sheet. From these sheets the accounts were typed, showing the total charge for the month's deliveries.

The enumeration of the disadvantages of this system is perhaps the best way of emphasizing the advantages of the subsequent machine accounting methods. These disadvantages are:

(1) The laborious copying of the same information from one document to another with the possibility of error at every stage.
(2) The lack of any automatic daily proof of the accuracy of the postings to the customers' ledger.
(3) The pronounced "peak load" created at the end of each month and consequent delay in the issue of the accounts.
(4) The disadvantage to the customer of receiving an account in total which could not be checked in detail against the advice notes.

Under the new machine accounting system, the advice postcard, despatch sheet and bound ledger were abolished, and a new advice note was introduced. This advice note is made out in triplicate by the despatch clerks or weighers; one copy is retained for reference, one goes to the customer, and one to the head office. At the head office the copies are priced and then sorted first according to the nature of the residuals supplied—*e.g.*, coke, coke nuts, breeze, benzole, tar, &c. —and handed daily to the machine operator, who makes a pre-list on her machine with sub-totals of quantity and value for each group and a grand total. This pre-list serves two purposes; it provides, in the sub-totals, the material for posting the analysis ledger, and in the grand total a check figure against which to compare the total of the postings to the personal ledger. The advice notes are then re-sorted into alphabetical order of the customers' names and posted to the customers' ledger.

The customers' ledger is of the loose leaf type required for machine accounting and is contained in a "quick relase" binder, so-called because when it is placed on its stand beside the operator it automatically unlocks, and is converted from a book into a collection of sheets which can be withdrawn individually for posting.

The customers' bill is prepared simultaneously with the posting of the ledger account. It remains with the ledger sheet throughout the month. The bill itself is in duplicate, one copy being for the customer and one for the City Collector's file. The impressions are conveyed to the duplicate and to the ledger sheet by means of carbon papers. When the end of the month comes and the last posting for the month s made, the accounts are complete and ready for despatch to the customer. Meantime, in the course of the month the new accounts have been addressed by addressing machine and are ready immediately to take the place of the old, and the whole process starts over again.

The machine on which this work is done is a Burroughs public utility machine. This kind of machine has many special characteristics, and those which have a special bearing on the general principles of machine accounting are worth mentioning. The first is that the machine cannot, with certain minor exceptions referred to later, be used to type letters of the alphabet in any combination in any position on the sheet as a typewriter can. It is almost entirely a figuring machine and cannot therefore type on the bill, for instance, the description of the goods supplied. Neither can it put the figures in any position on the sheet but is restricted to certain defined positions. It is, however, provided with certain alphabetical keys which, when depressed, cause the machine to print the month and a code reference to the goods supplied. The rest of what we may call the narrative of the bill is given by the standing printed matter on the bill itself. By this means, the machine is left free to perform its true function of figuring only, the meaning of the figures being indicated by their position on the bill.

The second characteristic of this machine is that it is an adding and subtracting as well as a printing machine, and automatically produces and prints totals and balances. All the time it is printing it is accumulating the figures inside, so that, for instance, in the preparation of the pre-list, the sub-totals are printed by the depression of a key, and are still carried forward for inclusion in the grand total, which is printed at the end by the depression of another key. Similarly in the posting of the ledger accounts, the operator picks up the previous balance, enters the new transaction, and the machine automatically calculates and prints the new balance on the ledger sheet and customer's bill. At the same time the machine accumulates the new transactions, and at the end of the posting produces a total which agrees, if the posting has been done correctly, with the total of the pre-list.

These brief details will be sufficient to show that several useful results are obtained by the machine accounting system, namely:

(1) The posting of the customer's ledger direct from the document of original entry without intermediate copying and a consequent reduction in clerical labour and in the liability to error.
(2) All arithmetical work except pricing done by the machine, which gives automatic proof of postings daily without laborious checking.
(3) Sales analysis almost as a by-product of the ledger posting.
(4) Reduction in "peak loads" at month ends, and prompter issue of bills.
(5) A detailed account to the customer with each item referred to the original advice note.

Issue of Gas Bills

I propose now to deal in some detail with the process of rendering the quarterly gas bills because this work lends itself particularly to the employment of mechanical aids, and is the most highly mechanized section of the office.

The foundation of the scheme is, of course, the survey record which contains the meter readings and all necessary particulars about the consumer, his meter, and appliances. There is one sheet for each consumer, and there are about 90,000 sheets which are normally kept in locked loose leaf binders in the survey department. They are transferred to smaller binders when required for meter reading on the district. Apart from short intervals of a few days between surveys, meter reading is continuous all the year round, and each meter is read normally four times a year. Taking into account special readings at other than the normal times, there are therefore something like 400,000 accounts to be issued each year, or about 1,500 each full working day.

The subject of continuous meter reading is perhaps worth some further consideration at this point. It was at one time the almost universal practice to have what we might call periodic readings. This method gave rise to certain difficulties.

It was inside the office that the real trouble was experienced through the periodic advent of the dreaded "peak load." There was always plenty of work for the staff in ordinary times, but when the survey was "on," pandemonium broke loose in the office, all work that was not immediately pressing was sacrificed on the altar of the survey, and if anything failed to get done when it should, the excuse of the survey was always ready to hand. When the survey came to an end and comparative peace again descended upon the office, all the loose ends had to be gathered together and accumulated arrears disposed of.

Just as it is the ideal of the gas engineer to level out the peaks and valleys in his curve of gas output, so should the office organizer try to eliminate excessive variations in the volume of work to be done in the office, so far as these are due to factors within his control. This is of particular importance when expensive office machines are to be used, because just as in the gas-works itself, equipment must be available for the peak loads, and the greater the peak the more plant there is lying idle at other times. When, therefore, machine accounting was first adopted in the Edinburgh Gas Undertaking, continuous meter reading was introduced as an essential preliminary.

The process of rendering a gas bill can be divided broadly into five parts:

(1) Writing up the document of original entry—*i.e.*, filling in the meter reading and other necessary particulars in the consumer's survey sheet.

If I may be permitted a slight digression here, I should like to stress the importance in the success of any accounting, and especially machine accounting, process, of accurate and reliable documents of original entry. If these are unreliable, then any accounting or statistical records based upon them are just so much waste paper. Little difficulty is experienced in this respect with meter readings because the readers are performing the same simple operation day in and day out. But with, say, stores accounting and the cost allocation of materials and wages, the original records are often made by workmen whose jobs are many and varied, and who regard anything in the nature of clerical work as a weariness to the flesh. Their returns are apt to suffer accordingly, and it has been my experience that the hardest job is not in the accounting, which can now be made nearly fool-proof, but in getting the records on which a reliable accounting can be based.

(2) The second part of the process is the addressing of the bill.
(3) The third is the entering of the charge.
(4) Is the folding and posting operation.
(5) The accounting records and analysis of revenues.

(1) With the first stage, meter reading, we are not greatly concerned here. Suffice it to say that twelve to fourteen completed books of 100 to 130 sheets each are returned by the meter readers each day to the survey department, where the charges are entered and extended with the inclusion of any hire charges or instalments, and the books are then passed to the addressing room of the accounts department.

(2) There the gas bills have already been addressed in advance of the meter reading and the appropriate bills are selected and placed inside the books, which then pass on to the billing section. The addressing operation is carried out by by Adrema addressing machines and equipment.

An interesting feature of the addressing machine is the selector and listing mechanism, which is useful in connexion with sales campaigns or maintenance service. Each plate has embossed on it "pips" indicating by their position the different types of gas appliances in the premises. Thus to get a list, say, of hire-purchase fires for periodical overhaul all that is necessary is to depress the appropriate selector key, pass the plates through the machine, and it will print a list of the addresses where there are hire-purchase fires, those plates where there are no hire-purchase fires being ignored. Similarly by means of what is known as "negative" selection, the machine can be asked for a list of premises where there are, say, no gas water heaters installed, and the sales department can then get busy hunting up prospects at these addresses.

(3) When the survey books with corresponding addressed bills reach the billing section, the calculations are first checked by the comptometer operators, who at the same time add up the total charge for each book to serve as a check against the billing machine totals. The billing machine operators then proceed to insert on the bills the particulars of the charges. These machines, like the residuals ledger machine, are purely figuring machines, the only alphabetical part being the date keys for showing the month of the year. The operators copy from the survey books the present and previous readings with the dates, and the consumption in cubic feet. There, if the subtraction has been wrongly made, the machine automatically locks and draws attention to the error. Then come the code references to the various charges, the therms, the numbers of any instalment charges, the detailed amounts in money of the various charges, and in the last column, the total charge which is automatically repeated in the collector's stub. All figures are placed automatically in their correct position on the bill. The machine prints no narrative whatever, the figures being explained by the column headings and code references. This makes for very speedy operation and the machine operators can turn out from 100 to 150 bills an hour.

PRECAUTIONS AGAINST FROST IN GAS-WORKS

By the courtesy of Mr. G. M. Gill, we are able to publish a most useful memorandum issued to the constituent undertakings of the Severn Valley Gas Corporation, Ltd.

Works Water Supplies

A works may draw its water supplies from one or all of the following sources: (*a*) Town supply; (*b*) river or canal; (*c*) well or bore hole.

(*a*) *Town Supply.*—Make sure the service into the works has sufficient cover. The minimum depth should be 2 ft. 3 in. Keep the supply running constantly if possible in very cold weather.

(*b*) *River or Canal.*—The suction pipe should be in an accessible place, as near 2 ft. below water line as possible. In most cases it will be difficult to keep the pipes protected from frost for their entire length, so during frosty weather it would be as well to keep the pump drawing slowly throughout the 24 hours of the day. It may be necessary to pour hot water over the exposed suction pipe at intervals. Ice which forms on the surface of the river or canal round the suction pipe should be *broken* and *removed.*

(*c*) *Well Water.*—The suction pipe should be laid as near 2 ft. deep as possible from the pump to the well, and the suction pipe inside the well should be roughly lagged with straw to 6 ft. below ground level. Bags of straw over the top of the well would be advisable in some cases. Again, in this case the pump should be kept steadily at work throughout the 24 hours.

The water pipes about the works should be protected according to their situation. Where pipes have to be in exposed positions there are several inexpensive ways of wrapping. For instance, whenever "straw rope" is used to protect goods delivered to the works it should be rolled up and put into store for this purpose. Old lagging from steam pipes, particularly the sectional type, is good enough for water pipes, and it can be rebound with strips of jute cloth. If cocks on water lines have to be fixed in exposed positions, those made of cast iron often burst. One way out of this difficulty is to use a "Saunders" valve. The rubber diaphragm inside will provide for the expansion of the ice and so save the body of the cock from bursting.

Water Tube Condensers

The temperature of the gas and water should be carefully watched, and in very severe weather readings of the temperatures should be taken every few hours. With thermostatically controlled condensers the water may be shut off entirely; due to the outlet temperature of the gas, and with the water stagnant, a freeze-up may occur near the condenser outlet. In such conditions the thermostatic control should be thrown out of action and the water supply controlled by hand in order to keep the water flowing. A steam jet impinging on the inlet water supply may be helpful in very severe weather.

Water Supply to Washers and Scrubbers

These supplies are usually small but are exposed to the weather. If closely lagged, and they happen to freeze, they are difficult to thaw with hot water. Straw rope wrapping therefore suggests itself for this purpose, and if freezing up does take place hot water can be effectively used. At the end of the winter the straw rope can be removed.

Purifiers

Steam is the best medium for keeping the water lutes of purifiers free from ice. A good arrangement is to have a permanent steam supply laid in the purifying house with a steam point handy for each lute. Flexible connexions will be necessary, and in this connexion it is not necessary to use flexible metallic tubing. Strong two- or three-ply ½ in. ribbed rubber hose will be suitable, and screwed connexions can be tightly wired on to the rubber hose, taking care to solder the wiring. To the free end of the rubber hose a No. 1 water circulator as used for gasholder cups can be fixed, and then a current of water can be made to circulate round the purifiers. The circulator could be used as required, while the temperature of the boxes should be watched to ensure that they do not exceed 80°F., in view of the danger of internal firing. The steam supply to the purifying house would require to be fitted with a good stop valve in order to cut out the steam circuit when not required.

Station Meters

(*a*) *Drum Type.*—These are usually housed in a substantial building, but normally no provision is made for heating the building. If steam is handy an inexpensive steam radiator can be easily built up in a suitable position from steam tubing and fittings. Care should be taken to fit a good steam trap on the outlet of the range of steam piping. If steam is not available, gas radiators can be used, but care must be taken that there are no gas leaks in the building. Most gas undertakings have second-hand radiators available for such a purpose. Anti-freezing solutions cannot be used, as these would run off at the overflow owing to the water level of station meters having to be maintained at a definite level.

(*b*) *Connersville and B.M. Meters.*—According to the makers, W. C. Holmes, of Huddersfield, these meters should not give trouble during very cold weather, and in a letter they stated that they have "quite a number of meters both Connersville and B.M. working outside in the open air and we were not advised of any trouble with these meters." It is probable therefore that trouble need not be anticipated with such types, but in the case of a Connervsille meter situated in a small brick-built meter house at Tetbury the meter stopped due to ice forming in the inlet box and falling on to the impellers, causing these to jam. This ice must have formed as a result of condensation from the gas, and there is probably no means of preventing this other than keeping the temperature of the meter house above freezing point. Reference to the desirability of doing this is made above under section *a.*

Gasholders

The severe weather experienced in 1940 proved that the gasholder should be the gas manager's first concern in frosty weather. If neglected, the supply to the town is endangered and immense structural damage can ensue. Different types of holders require different treatment, and therefore each type will be dealt with separately.

(*a*) *Anti-freezing Apparatus.*—This type of apparatus is essential to combat the dangers from severe frost. In fitting "Buffalo" circulators to gasholder lutes, rubber tubing can be used instead of expensive flexible metallic tubing. It should also be *very carefully noted* that these circulators should never be fixed to a holder lute without a suitable back pressure or non-return valve being fitted close up to the circulator or there is a clear danger of emptying the cup. Further, the valve controlling the steam should be as close as possible to the inlet end of the flexible connexion.

(*b*) *Single Lift Column Guided.*—A single lift, column guided holder should present little difficulty, especially when in a protected position. This type of holder is usually built with its tank below ground, and this affords great protection to the water against freezing. Where steam is handy, a water circulator should be ready for use, in order to keep the water circulating freely in the annular space between the holder and the tank. Where steam is not available, ice should be *broken* and *removed* immediately it is thick enough to handle. An old coke fork, cut down in width, is a handy tool for this purpose.

(*c*) *Telescopic Column Guided.*—A telescopic holder is always a greater responsibility than a single lift holder. Here the lute is the danger point in frosty weather. It must be kept free from ice, and a steam supply is the only suitable means by which this can be done. *Every holder lute must be fitted with a suitable water circulator or circulators.* The lutes of large holders may require two, three, or even four circulators. The water in the lute must not only be heated, but also kept on the move. The observations above relating to the holder tank naturally hold good with regard to telescopic holders. If no steam is available, the lute must be kept clear of ice in the same way as the tank by breaking and removing it before it is too thick.

A challenge to

TRANSPORT USERS

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THERE must be no weak link in the chain of Britain's war effort. The gathering momentum of production must not be hindered by inadequate transport. The country needs immediately thousands more wagons and lorries. They cannot be manufactured because of shortage of labour, of materials, of time. Yet if you, transport users, will help to cut down standstill time by even 15 per cent., the nation's transport facilities will be increased—by the equivalent of 100,000 *extra* wagons and lorries.

In effect, you can do a great deal to supply Britain with these extra vehicles practically overnight. Now is the time to plan and work to get a Quicker Turnround of the vehicles you use.

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2—Have you installed labour-saving equipment to speed up loading and unloading? If this is not possible have you improvised?

3—Do you help consignees by informing them, as far as you can, when the goods you forward may be expected to arrive?

4—Are your arrangements between your office and your loading staff as good as they should be? For instance, have you arranged for the immediate checking of loads?

5—Have you talked the matter over with the men who actually load and unload?

6—Do you make the most of every hour of daylight to clear loads, carrying on into the blockout when possible?

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SPEED UP LOADING AND UNLOADING

Issued by the Ministry of War Transport.

(*d*) *Single Lift Spiral Guided.*—Spiral guided holders are a greater responsibility than column guided in frosty weather. Most spiral guided holders have been built in the last forty years, and the frost of 1940, which was the most severe in that period, disclosed certain dangers with spiral holders which will have to be carefully guarded against in the future.

Not only have spiral holders been developed in the last forty years, but the same applies more or less to steel tanks, which are nearly always above ground. Thus we often get the combination of a spiral holder in a steel tank, all above ground level. With this combination there is no protection for the water in the tank against icy cold winds. Thus the whole of the water in the tank falls in temperature until it reaches 32°F., when it is ready for the quick formation of ice as soon as there are a few degrees of frost. On a works with this type of holder where normal steam supplies are available, the ice formation round the outside of the tank can easily be dealt with by steam assisted perhaps with the removal of some of the ice by hand. The main danger, however, is the formation of ice on the surface of the water within the holder. If this takes place, and the ice freezes sufficiently to reach the danger thickness, we have a rigid mass which cements up the whole of the surface of the water up to and including the holder sides, and embedded in this ice are the holder inlet and outlet pipes. When this set of conditions takes place, any movement up or down of the holder will twist and probably fracture the holder connexions.

In frosty weather the obvious thing is to prevent the temperature of the water in the tank being reduced below 32°F., and for this purpose steam should be injected into the tank through suitable water circulators, or, in other words, anti-freezing apparatus. Experience has shown that it is not sufficient to warm the water on the top of the tank round the holder, but that regard must be had to freezing at other parts of the tank, and particularly on the inside of the holder and on the side of the tank plates. Ice on the tank plates is likely to form on the windward side of the holder. To prevent this, the outside of the tank should be protected by hanging tarpaulin sheets from the gangways on the windward side in such a way as to enable them to be readily moved should the wind change.

To warm the water well below the surface, steam should be admitted through water circulators placed some feet below the surface of the water and pitched slightly towards the centre of the tank. The object of this is to supply warm water into the inside of the holder tank and so prevent the formation of ice on the inside of the holder. It is obvious that these circulators should be readily movable to enable the warm water to be driven into the tank under the bottom lift of the holder, and therefore the level of the water must be such as will permit of this being done. It is quite clear that the steaming of the water must be started in good time and before ice is allowed to be formed.

Experience has also shown that it has in most cases been the outlet and not the inlet pipes which have been damaged, and in practically every case it has been in spiral and not column guided holders. The fact that the damage has been to the outlet pipes suggests that the sensible heat of the inlet gas has been sufficient to prevent ice from forming too thickly or rigidly to the inlet pipe. As a consequence of this experience steps are being taken to develop means whereby gas can be heated before passing into holders through not only the inlet but also the outlet pipes by making the suitable connexions. In the case of spiral holders, the guide rails should be kept under regular inspection, and all snow and ice should be removed, as otherwise the holder is likely to jam in the carriage rollers. Hot water is effective for this purpose. Managers should be particularly warned against ice being allowed to form on the guide rails, as great damage can result from this.

(*e*) *Telescopic Spiral Guided.*—The observations on single lift spiral holders applies of course to telescopic spiral holders, but several additions must be made. First of all the lutes should have very prompt attention and be steamed on the first sign of frosty weather. Whenever a holder lute is steamed, the condensed steam will cause the lute to overflow. This does not matter a great deal in the case of column guided holders, but with spiral holders this overflow will invariably run down one particular rail. On this rail there will be a very fast formation of ice, so it is imperative that the manager should satisfy himself regarding which rail is catching this overflow, and in severe weather this rail should be cleared of ice as often as is found necessary.

(*f*) *Gasholders Generally.*—Snow should be cleared from the crowns of holders *immediately*. The work should always be carefully supervised, the clearing being always commenced at the centre with the men working outwards towards the rails. The men should be paired off with instructions to work opposite each other. Carelessness in removing snow after a heavy fall whereby one side has been cleared first has resulted in holders being buckled and distorted. After clearing the crown, the rails on spiral holders should be cleared with hot water. In a severe frost, holders should not be allowed to remain stagnant for days together. They should be at least inflated or deflated a few sheets daily.

Possible damage to the inlet and outlet connexions through ice formation has already been dealt with. There are other possibilities of damage. A severe internal freeze-up could so rigidly hold a gasholder that, should it be turned on to the district, the pressure would promptly disappear. All supplies on the district would fail, but the trouble would not end there. If it were a telescopic holder, the top lift would fall, the water seal would disappear, and if a spiral holder the lift would run down, and eventually crash into the tank, unless the spiral rails were themselves designed to prevent their slipping through the carriages. Stops bolted to the tops of the spiral rails would not prevent the top lift crashing into the tank, as the bolts would be sheared.

In the case of a column guided holder, the top lift would drop in but be caught by the top carriages, but the chances are that these would be smashed off and the top lift fall into the tank. If the top lift tipped slightly in falling, there would be every chance of the columns being bent or broken off.

Station or District Governors

The water in the tanks should have anti-freezing mixture added as soon as frosty weather is expected. Car anti-freezing mixtures have a freezing point of 26°F. at the recommended strength, and this may be lowered by increasing the percentage of mixture. Glycerine solution 12% by volume has the same freezing point—*viz.*, 26°F.—and is cheaper than prepared car radiator mixtures. Care should be taken when adding these mixtures. The water in the tank should be gently agitated, and further, the precaution should be taken of removing some of the tank water first, so as to be sure that when the governor bell is in its lowest position, and the mixture added, the water level is just below the overflow. If this is not done, the anti-freezing mixture may be drained away through the overflow.

Use of Tarpaulins in Frosty Weather

In the case of gasholders, reference is made above to the use of tarpaulin sheets for the protection of an exposed tank. No gas-works should be without a supply of tarpaulin sheets, but these require care in their storage. They will be found invaluable in winter for many purposes. They are useful for exposed purifiers, sheeting-off draughty openings of purifier houses, protection of Livesey washers, P. & A. tar extractors, and rotary washers. Again, all works should keep a supply of straw rope for the wrapping of water pipes or even ammoniacal liquor pipes.

Gas Engines

All gas engines should have a "frost light" or small burner fitted below the cylinder or breach end. The burner should be so fitted that the flame actually touches the cylinder casting. In cold or frosty weather this burner should always be kept alight when the engine is not running. If the engine is not used regularly it is also advisable to drain the water jacket. If this is done, note carefully that the stop cock between the engine and water tank closes properly. If the cock leaks slightly and the drain tap should freeze, then the water will fill up the pipe and water jacket, which in severe frost is liable to fracture. For this reason the frost light should always be kept alight.

As far as possible the temperature of buildings where engines, compressors, exhausters, and pumps are housed should be kept above 50°F. With cold engine rooms and houses it is necessary to increase the lubrication at starting, as the oil flows slowly when cold and lubrication may be insufficient. Again, when the engine warms up the oil supply must be reduced to the normal amount.

Compressors—Air or Gas

With all water-cooled compressors, the water jackets should be drained and the same precautions taken as recommended for gas engines. Means should also be provided for draining the delivery pipes of air and gas compressors.

Boilers

(*a*) *Boilers not Working.*—If not emptied, small fires should be kept alight to ensure that the water is above freezing point.

(*b*) *Steam Gauges.*—Steam gauges and their connexions, unless thoroughly protected, are liable to injury through frost, many being destroyed every winter by the freezing up of the water column. When fires are to be withdrawn, or even banked up for a time, the syphon pipe should be thoroughly drained, and the taps should not be opened until steam is being raised.

(*c*) *Glass Tube Gauges.*—In every case where fires, through any cause, are drawn or allowed to die out—particularly with boilers in exposed situations—the glass tube gauges should be emptied, the taps to water and steam connexions being left closed until the boiler is again to be set to work. The drain taps should of course be kept open, and the usual care taken to ascertain the actual water level before kindling fires.

(*d*) *Feed Water Apparatus and Connexions.*—All pipes in exposed positions should be drained when not in use, and the same care should be observed to guard against water collecting about pumps and injectors. Pipes, pumps, &c., are frequently covered with straw and other non-conducting materials, but during severe frost these cannot be relied upon to prevent water when at rest from being frozen. When this occurs, burst pipes and other damage more or less serious are sure to follow the starting of the pump.

(*e*) *Water Cisterns.*—The supply pipes and regulating apparatus should be frequently examined in frosty weather.

(*f*) *Extra Care Required during Frosty Weather.*—Engines and boilers, in addition to the attention required to keep them in working condition at ordinary times, should be specially attended to during the prevalence of frost, particularly at those parts where, owing to condensation, &c., water is likely to collect in such quantities as will be easily frozen.

A little extra trouble taken at these times will be amply repaid by freedom from the accidents and stoppages which are so frequent during frosty weather.

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Gas Products Prices

The London Market

Dec. 22.

Current prices of Coal Tar Products in the London market are about as under:

Pitch nominal; creosote 5d. to 5¼d.; refined tar 4d. to 4¼d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d.; and 90/160 pyridine 13s. 6d.; all per gallon naked *ex* Makers' Works. By the Direction issued under the Control of Coal Tar Order, 1941, maximum prices have been fixed for all grades of Naphthalene. The maximum price for refined crystal naphthalene in 2-cwt. bags and in 4-ton lots is £23 per ton delivered.

The Provinces

Dec. 22.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6¼d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10.

Tar Products in Scotland

GLASGOW, Dec. 20.

More activity is noticeable in this area and prices continue strong.

Refined tar is still in good call at 4¾d. to 5d. per gallon in home markets and about 4¼d. to 4½d. per gallon for export, both f.o.r. naked.

Creosote oil: Production is readily disposed of at the following prices: Specification oil, 5¾d. to 6d. per gallon; low gravity, 6½d. to 7d. per gallon; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk.

Cresylic acid remains difficult with values nominal. Pale, 99/100%, 4s. 9d. to 5s. 3d. per gallon; Pale, 97/99%, 4s. 3d. to 4s. 9d. per gallon; Dark, 97/99%, 4s. to 4s. 3d. per gallon; all *ex* Works in buyers' packages.

Crude naphtha shows no alteration at 6½d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha: 90/160 grade is firmer at about 2s. per gallon and 90/190 Heavy Naphtha is 1s. 6d. to 1s. 9d. per gallon.

Pyridines are quiet with 90/160 grade about 14s. per gallon and 90/140 grade about 16s. per gallon.

Cannon Iron Foundries, Ltd., have declared a dividend on the 5½% Redeemable Cum. Pref. Shares at the rate of 5½% per annum, less Income Tax, for the two years ending Dec. 31, 1941, payable Jan. 1, 1942. The Seventh Ordinary General Meeting will be held at the registered offices of the Company on Dec. 31, at 11.30 a.m.

Gas Stocks and Shares

Markets last week continued overshadowed by Far Eastern uncertainties and were generally dull with only a small volume of business. Some end-year selling took place in the gilt-edged market though prices closed with little change. In other sections issues geographically vulnerable, such as Eastern tin and rubber shares, bore the brunt of the situation.

Despite the general conditions the Gas Market was fairly well supported and with few exceptions prices remained unchanged. Except among the larger issues supplies continue short, and any business done is sufficient to send up the price. A parcel of Cardiff ordinary, for instance, came into the market for the first time since July and the quotation was marked up 5 points. On the other hand, some forced selling of Imperial Continental caused a drop of 5 to 55½. There were the usual number of *ex. div.* markings of debenture stocks due about this time of the year.

The following price movements were recorded during the past week:

OFFICIAL LIST

Alliance & Dublin Ord.	93—98	−2	
Bournemouth 4 p.c. Deb. (*x.d.*) ...	90—95	Dec. 15	
British 5½ p.c. "B" Cum. Pref. (*x.d.*)	105—115	,,	
Ditto 4 p.c. Red. Deb. (*x.d.*) ...	75—80	,,	
Cardiff Ord.	95—100	+5	
East Surrey 5 p.c. Deb. (*x.d.*) ...	90—95	Dec. 15	
Imperial Continental	53—58	−5	
Oriental (*x.d.*)	113—118	Dec. 15	
Portsmouth Cons.	87—92	−1	
South Metropolitan	48—53	−2	
South Suburban 5 p.c. Deb. (*x.d.*)...	97—102	Dec. 15	
Wandsworth 5 p.c. Deb. (*x.d.*) ...	99—104	,,	
Ditto 4 p.c. Deb. (*x.d.*)	79—84	,,	

SUPPLEMENTARY LIST

Brighton 5 p.c. Deb. (*x.d.*)	93—95	Dec. 15
Ditto 5½ p.c. Red. Deb. (*x.d.*) ...	95—100	,,
Cheltenham 4 p.c. Deb. (*x.d.*) ...	75—80	,,
Slough 5 p.c. Deb. (*x.d.*)	87—92	,,
Southampton 5 p.c. Red. Deb. (*x.d.*)	95—100	,,

PROVINCIAL EXCHANGES

Bristol Ord.	96—98	+1

METRO
TRADE MARK

IN normal circumstances this space is occupied by information concerning the many Coal Tar and Ammonia Chemicals produced by the South Metropolitan Gas Company.

MANY of these products, required in the last war, are wanted more than ever to-day for war purposes.

CERTAIN "Metro" products, however, are available for normal business, such as Medium Soft Coal Tar Pitch, Creosote Oils, Dry Neutral Sulphate of Ammonia, etc., and enquiries for these should be directed to the manufacturers:—

SOUTH METROPOLITAN GAS COMPANY
Products Department:
REGIS HOUSE,
KING WILLIAM STREET,
E.C.4.
Telephone: AVENUE 2755.

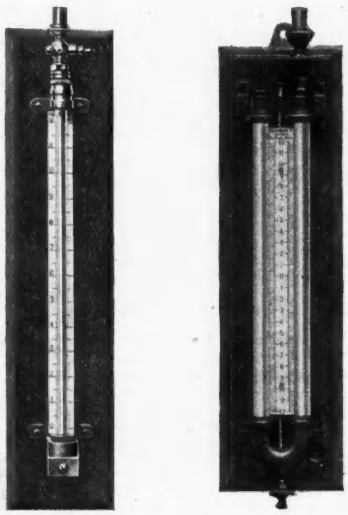
JAN 20 1942

En passant

Small cheer and great welcome
Makes a merry feast.

Shakespeare (Comedy of Errors).

Illustration shows two types of Water Column Pressure Gauges. Sizes range from 6" to 48". They can be calibrated for pressure, vacuum or differential readings.



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